

FAT12, FAT16 & FAT32

	Max file size	Max volume size
FAT12	32MB (8KB clusters)*	32MB (8KB clusters)*
FAT16	2GB/4GB**	16GB (256KB clusters)**
FAT32	4GB	32GB (Windows format) 2TB (other OS) 16TB (theoretical)

*16MB with 4KB clusters

**Different FAT16 versions were limited to a maximum volume size of 2GB, 4GB or volume size, with volumes limited to 2GB, 4GB, 8GB or 16GB depending on cluster & sector size.

FAT12, FAT16 & FAT32

- File allocation table = "FAT".
- Major variants = FAT12, FAT16 & FAT32.
- Each has an increasing number of clusters, and maximum file and volume sizes.
- FAT32 remains popular due to wide OS compatibility.
- Still widely used for removable media.

NTFS

- New technology file system = “NTFS”.
- File size limit of 16 exabytes (EB).
- Journaling file system (to avoid corruption).
- Supports file permissions and encryption.
- Windows must be installed on NTFS drive.
- Limited non-Windows OS compatibility — eg read-only in macOS and older Linux distros.

exFAT

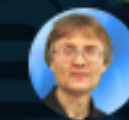
- Extended file allocation table = "exFAT".
- File system optimized for high-capacity USB flash drives and memory cards.
- Maximum file size = 16EB.
- Default file system for SDXC cards.
- Broader non-Windows OS support than NTFS — including read and write on macOS.

ext2, ext3 & ext4

- In 1992, the “extended file system” (ext) was launched for Linux.
- In 1993, ext2 was released.
- In 2001, ext3 introduced journaling.
- In 2008, ext4 became the Linux default FS.
- Files up to 16TB and volumes up to 1EB.
- No native Windows or macOS support.

HFS, HFS+ & APFS

- HFS = hierarchical file system for macOS.
- HFS also known as "Mac OS Standard".
- In 1998, HSF+ ("HSF Extended" or "Mac OS Extended") introduced with journaling.
- Files and volumes up to 8EB (macOS 10.4).
- In 2017, Apple file system (APFS) launched.
- No native Windows or Linux support.



ZFS

- ZFS = zed file system.
- Created by Sun Microsystems, and now developed by the OpenZFS Project.
- Integrated volume manager to control storage hardware.
- Hence provides increased data protection.
- Available for Linux, FreeBSD and TrueOS.

Choosing a File System

- For a system drive, use NTFS (Windows), ext4 (Linux) or HFS+/APFS (macOS).
- For USB drives and memory cards, use FAT32 for capacities under 32GB . . .
- . . . and use exFAT for 32GB+ or 4GB+ files.
- For other drives, use NTFS if Windows based, exFAT if PC/Mac based, or FAT32.